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BOTANY.

Notes on Rare East Tennessee Lichens.—Two months of constant work, for which previous experience in Florida had prepared me, have been well rewarded by the securing of two hundred species, many, of course, common. Tennessee has ever been a paradise for the phanerogamic botanist, and justly so; but I venture to affirm that but few have delved very deeply for our humble lichens. And yet the inherent interest attaching to these plants is vastly enhanced by the inspiring associations of locality. Mountain-tops and their craggy sides, rent in places by deep cañons with towering walls on either side, two thousand feet in height, showing different geological strata, and affording a foothold for the holly, birch, and hemlock, present peculiar charms as well as advantages,—for each different stratum or tree may be the favorite substrate required to promote the growth of certain species. I find this fastidiousness as true of lichens as of their more pretentious and showy neighbors in the floral world. Economy of space will confine my notes now to some of those species that are practically rare or unknown in American Herbaria.

Ramalina calicaris, var. *farinacea* Schaer; somewhat abundant on sandstone on Lookout Mountain.

Theloschistes concolor Dicks; on oak and hickory trees; common.

Parmelia ambigua Ach.; on *Pinus mitis*. I omit a dozen other fine species, of which *P. borrieri* is best developed.

Physcia ciliaris, var. *crinalis* Schaer; on oaks and Nyssa up to two thousand feet elevation; very fine.

Physcia aquila, var. *detonsa* Tuckerm.; abundant on Quercus on Lookout Mountain, and also on sandstones.

Pyxine sorediata Fr.; very finely fruited; abundant on sandstones, occasional on oaks.

Umbilicaria pennsylvanica Hoffm.; on sandstones; common; most developed at high elevation.

Sticta pulmonaria L.; found only twice,—on oaks along the mountains.

Peltigera canina; abundant in damp, shaded gorges.

Leptogium juniperinum Tuckerm.; exists in rosulate clusters on rocks and on cedar; a subspecies of *L. tremelloides*; Lookout Mountain.

Lecanora affords interesting forms. Among them, *L. cinerea*, *L. badia*, *L. tartarea*, a very elegant species with immense apothecia, in

appearance reminding me of *L. pallescens*; the ever-varying *L. cervina* Nyl.; subspecies *L. privigna*—var., is abundant, and of large size, with remarkable spores; on sandstone; I omit several other species.

Cladonia; of the numerous species I will only cite *C. cæspiticia* Flotow, and *C. turgida* Hoffm., which grow on bare rocks and earth at some elevation.

Passing by *Bæomyces* I find in *Biatora* a multitude of species, and mostly on rocks; as *B. rubella* Rabh., in several subspecies; *B. coarctata* Th. Fr., and var.; on trees are *B. russula* Mont., and *B. parvifolia* Pers.

Lecidea enteroleuca Fr., *L. platycarpa* Ach., *L. albocærulescens* Fr., occur on sandstones and chert in puzzling forms; *Buellia* affords interesting species, largely saxicolous; among the latter are *B. colludens* Nyl., *B. petraea*, and var. *albinea*, *B. spuria* Arn.; while the parasitic *B. inquilina* and *B. parmeliarum* occur on the thallus of other species.

Lecanactis premnea; on bark.

Platygrapha periclea Tuckerm.; found only on hemlock in mountain gorges, but associated with it are *Pyrenula thelena*, and a very interesting *Biatora* near *effusa*.

Sagedia cestrensis and *S. oxyspora* on *Ostrya* and *Betula*.

Verrucaria pyrenophora is abundant on limestone.

These are only a few species identified from a practically unexplored mass of material. My thanks are due to my friend, S. Higginson, Esq., for assistance, while my Rabenhorst and Lojka specimens have enabled me to make good comparisons, especially in rock forms.—W. W. CALKINS, *Chicago*.

Botany in the British Museum.—The recent report of the Curator of Botany in the British Museum contains a number of interesting matters. It appears that during the year 51,652 specimens were “mounted, named, and inserted in their places in the herbarium.” These accessions came from many parts of the world,—Europe, China, Japan, Borneo, Africa, Australia, Canada, Mexico, and South America. It is consoling to American botanists to read that “the exhibited series of British plants has been completed as far as the vascular plants are concerned, every species recognized by Bentham in his ‘British Flora,’ being placed in the case, with its description from that work.” If the complete exhibition of the British flora has just been achieved in so richly endowed an institution, we need not consider ourselves unduly delinquent in this country, where the local floras are so poorly represented in herbaria.

Amer. Nat.—November.—7.

A thorough revision and rearrangement of the natural orders has made some progress, already including the Gramineæ, Compositæ, Caryophyllaceæ, Cupuliferæ, Filices, and several others. During the year the collection of microscopic preparations, numbering 4,429 specimens, made by Professor DeBary, was acquired by purchase. Many valuable collections of varying sizes were presented, and as many more were purchased.—CHARLES E. BESSEY.

The Word "Herbarium."—A writer in the *Pharmaceutical Journal*, Mr. G. C. Druce (quoted in the September *Journal of Botany*), says: "The origin of the word herbarium, as applied to a dried collection, is by no means certain. It is true we frequently meet with the name in the older writers, but to them it meant a book about plants, and generally an illustrated book." He then, after a general discussion, describes an old parcel of plants at Oxford which he examined recently. The specimens were in a good state of preservation, and proved to have been prepared by one Gregory of Reggio in the year 1606. This collection was labeled on the back "*Herbarum Diversarum Naturalium*." This the writer thinks is the earliest use of the word in this sense. Gregory of Reggio "was noted for his botanical knowledge."

The Microspores of Sphagnum.—In a preliminary communication in a recent number of the *Botanisches Centralblatt*, S. Nawaschin, of Moscow, attempts to answer the question as to the nature of the so-called "microspores" of *Sphagnum*. Having good material of *S. squarrosum* in various stages of development, he found that the microspores appear to develop from fungus-hyphæ, instead of from the well-known spore-mother-cells of the Bryophyta. Fungus-hyphæ were found in other portions of the *Sphagnum* plant-body, also adding to the probability of the fungus nature of the microspores. The investigator ventures the surmise that these puzzling spores are not *Sphagnum* spores at all, but those of Ustilagineæ, of the genus *Tilletia*. To it he gives the provisional name of *T. sphagni*.

The Species of Cotton.—Schumann, in his elaboration of the Malvaceæ for Engler and Prantl's "*Natürlichen Pflanzenfamilien*," recognizes three species of *Gossypium* (cotton), viz.:

G. barbadense L., with the "cotton" easily separated from the seeds, which are then naked.

G. arboreum L., "cotton" separated with difficulty, seeds with a persistent coat of short filaments, leaf-points oblong, flower purple-red.

G. herbaceum L., with "cotton" and seeds as in the last, leaf-points broad-ovate, flower yellow.

The first is a native of America, and is known as "sea-island cotton," "Barbadoes cotton," or "New Orleans cotton." The cotton of Peru is considered to be a variety of this species.

The second species has long been grown in Egypt, Arabia, and India, and produces an especially white cotton.

The third species is the one now so extensively grown in the Southern States, to which it was introduced from India a little more than a hundred years ago. During its long cultivation (more than 2600 years) it has given rise to a number of marked varieties, of which var. *religiosum* L., with yellow cotton, is known as "Nankeen cotton."

Fertilization of the Grape.—Dr. M. Kronfeld states that although the cultivated grape-vine is usually anemophilous, yet that, under certain conditions, it is fertilized by honey bees, especially when there is in the same neighborhood an abundance of other plants which are visited by bees (*Jour. Roy. Micros. Socy.* for August).

Another "Ism" in Botany.—A new word has been invented by Dr. Clos, to be applied to the dwarf-condition of plants. He calls it "nanism."

The Annals of Botany.—Number 13 of this excellent botanical periodical contains the following papers:

A monograph of the British Gastromycetes, by George Massee.

On a change of flowers to tubers in *Nymphaea lotus* var. *monstrosa*, by C. A. Barber.

On the change of shape exhibited by turgescient pith in water, by Anna Bateson.

Observations on the structure of the nuclei in *Peronospora parasitica* during the formation of the oospore, by Harold W. T. Wager.

On some recent progress in our knowledge of the anatomy of plants, by D. H. Scott.

The "Notes" are: A new application of photography to the demonstration of certain physiological processes in plants; double-flowered *Ceanothus*; on Dr. Macfarlane's observations on pitched insectivorous plants; attempts to induce aposporous developments in ferns; a lily disease in Bermuda; the onion disease in Bermuda; a hybrid desmid; *Vaucheria*-galls; the stomata in the fruit of *Iris pseudacorus* Linn.; *Mystroptalon thomii* Harv.

In number 14 the leading papers are the following :

Monograph of the Lemnaceæ of the United States, by George F. Atkinson.

The mucilage- and other glands of Plumbagineæ, by John Wilson.

Note on the fertilization of *Musa*, *Strelitzia regina*, and *Ravenala madagascariensis*, by G. F. Scott-Elliot.

Ornithophilous flowers in South Africa, by G. F. Scott-Elliot.

Notes on *Chondrioderma difforme*, and other Mycetoza, by Arthur Lister.

The "Notes" are: On cortical fibro-vascular bundles in some species of Lecythideæ and Barringtoniæ; *Vaucheria*-galls.

A New Work on "Plant Morphology."—Plant morphology has not in general been of such a nature as to commend it to the more critical of our scientific men. It has been too largely a merely technical discussion of those external structures which can be made use of in classification. So great has been the abuse of the term that many of the botanists of the new school refrain from using it lest they be misunderstood. What the study of the skins in the old-fashioned museums was to zoology, that the so-called "morphology" of the common botanical books has too largely been. The student of animals has long since discarded such a profitless labor, and has substituted the careful study of structural homologies based upon similarity of development. Animal morphology to-day occupies the greater part of the attention of zoologists, while comparatively little time is given to the study of purely external and superficial characters. In this way zoology has become much more philosophical than its sister science, botany.

A new work on the general morphology of plants ("Allgemeine Morphologie der Pflanzen"), by Dr. Ferdinand Pax, is written upon a somewhat higher plane than most of its predecessors, and will doubtless prove a good example to our text-book makers. It is divided into two principal parts, the one treating of the Morphology of the Vegetative Organs, and the other of the Morphology of the Reproductive Organs. The vegetative organs are included under "root" and "shoot," each of which is then discussed under several heads. The shoot is treated as follows: (I.) The structure of shoots and the shoot-system; (II.) biology of shoots; (III.) plasticity of shoots; (IV.) the life-history of the shoot; (V.) leaf-sequence in the shoot; (VI.) the leaf. The root is treated similarly, but at less length. In the treatment of the second part of the work, that relating to the reproductive

organs, there is less departure from the ordinary methods. There is a discussion, much after the usual fashion, of the "morphology" of the flower-cluster, and the flower, and in this the student will receive few if any new ideas. In the discussion of reproduction proper there is again much more that is modern and instructive. Thus we have:

(I.)—Non-sexual reproduction.

(II.)—Sexual reproduction.

1.—Sexual reproduction of the Cryptogams.

2.—Sexual reproduction of the Phanerogams.

3.—Relation of sexual to non-sexual reproduction.

An interesting section is devoted to the phylogenetic development of the flower. The "flower" is very properly regarded as an evolution from modifications of the plant-body found in the Pteridophytes. The spore-bearing cone of *Selaginella* is "the prototype of an hermaphrodite naked flower," between which there is often a marked external resemblance.—CHARLES E. BESSEY.

ZOOLOGY.

A New Phoronis.—Dr. E. B. Andrews has found a new species of the remarkable genus *Phoronis* at Beaufort, N. C. It lives in isolated chitin-like tubes placed upright in the sand. The species has the greatest affinity with *Ph. kowalevskii* in the arrangement of its sixty tentacles, but it is remarkable for the presence of spoon-shaped glandular organs at either end of the lophophore. The function of these organs is unknown, but it is suggested that they may have some connection with the tube-building habit. The alimentary canal consists of two stomachs and an intestine. In the first stomach there is a longitudinal ridge of ciliated gland-cells, recalling that of *Sipunculus*. There is also a peculiar intracellular digestion in the first stomach. Apparently the sexes are separate. The left nerve-rod only has an extensive development. Dr. Andrews thinks that this species, which he has named *Ph. architecta*,¹ approaches nearer to the *Sipunculus* than to the *Polyzoan* type.

¹ *Ann. and Mag. Nat. Hist.*, June, 1890.